Gas Turbines Work Group - ICCR

Minority Report on Selection of Pollutants for Testing

The environmental organization representative of the GTWG has one disagreement with the list of pollutants selected for testing by the GTWG. It regards turbines burning landfill gases. The minority maintains that these turbines should be tested for dioxin emissions for the following reasons:

1. All combustion devices burning landfill gases were placed in the moderate category for dioxin formation potential in the primer presentation given to the ICCR. No device burning landfill gas was placed in a category below moderate. Landfill gas turbines were not listed.

2. Landfill gases contain halogenated species and other complex organics which, when burned, have the potential to create dioxin. Landfill gas is a complex fuel. Complex organics in the fuel was listed at the dioxin primer as one of the conditions more likely to lead to dioxin formation.

3. Also, the amount of chlorine present is definitely sufficient. This was a second listed condition.

4. Natural gas and refinery gas has been found to contain metals. Landfills also contain quite a bit of metal. There is potential for metals to vaporize and become mixed with the gas, supplying the requisite metals listed as a third condition in the primer materials.

5. Many on the GTWG maintain that the inherent good combustion practices (GCP) of a turbine ensure that no dioxin can be created or, if any is present, would be completely burned. I am not at this time convinced that GCP is maintained uniformly throughout the landfill gas turbine industry. Nor have I seen evidence that post combustion conditions are uniformly preventative of dioxin formation. In certain situations poor combustion is possible. Particulate formation is also possible. Particulate hold up in a critical temperature window may also be possible, especially post-combustion, depending on the exhaust and stack design of the facility. I am not aware of cold quench techniques being uniformly applied to prevent downstream formation. Moreover, other devices burning landfill gases, such as boilers, were listed in the moderate category for dioxin formation potential, even though good combustion practices were noted.

6. There are references that confirm that dioxin is emitted from landfill gas combustion. See Lahl, U., Wilken, M., Zeschmar-Lahl, and Jager, J. PCDD/PCDF balance of different municipal waste methods. Chemosphere 23 (8-10): 1481-1489 (1991). "Exhaust gas after combustion of landfill gas in flares or fires can contain considerable amounts of dioxin. We found 75-217 pg (TE)/m3. The study noted

that other authors report values up to nearly 1 ng (TE)/m3." Also see Jones, K. Comparing air emissions from landfills and WTI plants. Solid Waste technologies. March/April 1994. This paper confirms that dioxin has been measured in emissions from flares and internal combustion engines burning landfill gas in Germany. See GH Edulgee, ERM P Dyke, ETSU, AEA Technology PW Cains, Technical Products Division, AEA Technology. Susan Thornloe, Senior Project Officer with USEPA-ORD wrote me that "all the data on by-product emissions associated with LFG combustion is that it is similar to emissions from controlled MWC". E-mail of 3 Nov 97, 6:57 p.m.

7. According to Jones, quantitative data on dioxin emissions from controlled landfills in the U.S. is non-existent.

8. Dioxin is extremely toxic. It is included on the EPA's Early Reductions Program List of High Risk Pollutants (Table 1) with a weighting factor of 100,000. No other pollutant is weighted at greater than 1,000. Dioxin is also very bioaccumulative (rate = 250,000 - 1,000,000 : 1. EPA has reported that most adults and children already have levels of dioxin in their bodies at or near the concentrations that cause fetal and immune system problems. I have small children that are being poisoned by dioxin. I am being poisoned by dioxin. You are. Therefore, any additional loading to the environment represents an unacceptable risk. Any dioxin releases are significant, even those which are only temporary or occasional, however brief.

9. This work group is in the process of evaluating whether operational practices may be useful as control technologies for gas turbines. The question of whether dioxin is formed at landfill gas turbines under certain operating conditions is particularly critical for us to answer because if dioxin is created under certain conditions or practices, it would certainly influence whether or not we choose to adopt operational methods or combustion practices as part of our MACT.